Instructions for running the DSL

1. Download and install [MPS version 2021.2.2]

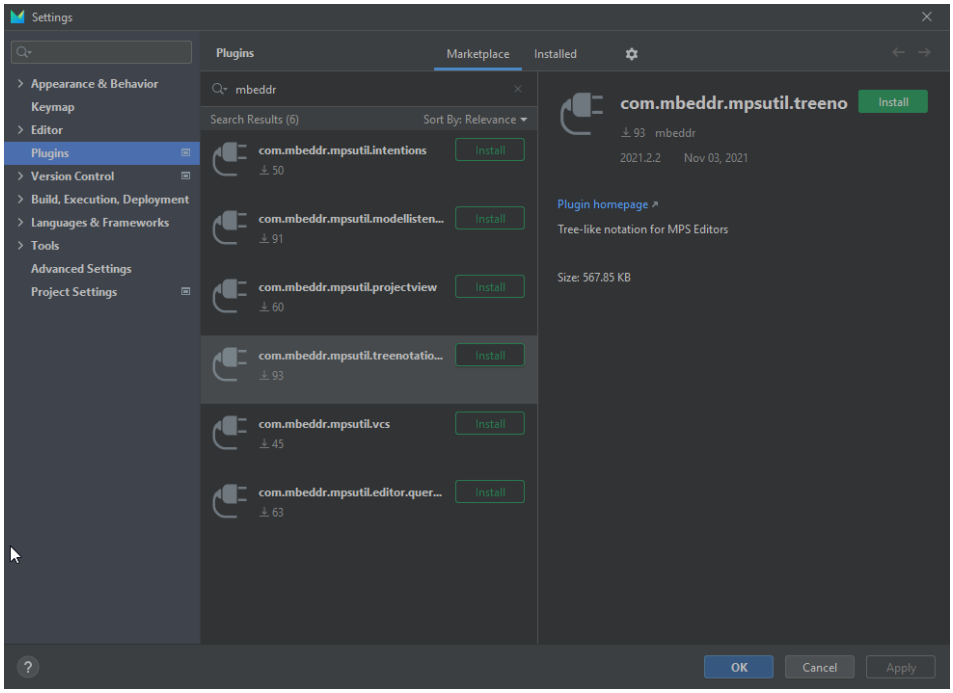
2. Download or clone the project from [GitHub repository]

3. Open MPS, and then open the DSL project by selecting the folder

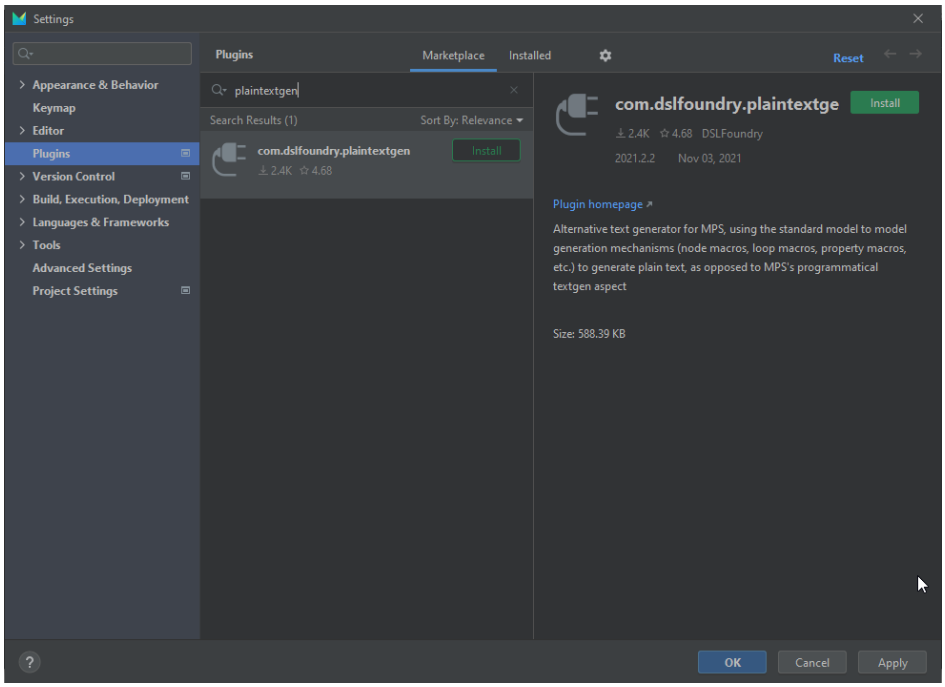
4. Some plugins must be installed. Select File -> Settings -> Plugins and install the following plugins:

   Note: Some of these plugins require additional plugins that MPS will suggest you install (if this happens, simply select install). For example, the *com.dslfoundry.plaintext* plugin will require the *Mouse Selection Support* plugin.

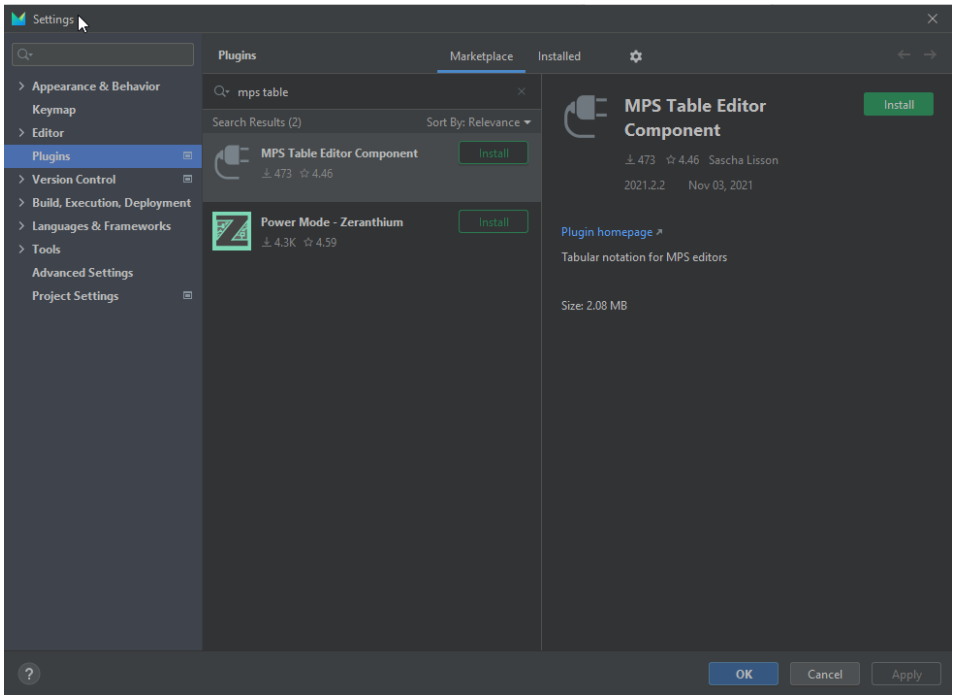
   a. com.mbeddr.mpsutil.treenotation



b. com.dslfoundry.plaintext



c. MPS Table Editor Component



5. Restart MPS and you will now be able to use the DSL to model IoT systems. In the left pane (*Logical View*) you find an example of a modeled IoT system (*Hotel Beach first floor*). You can

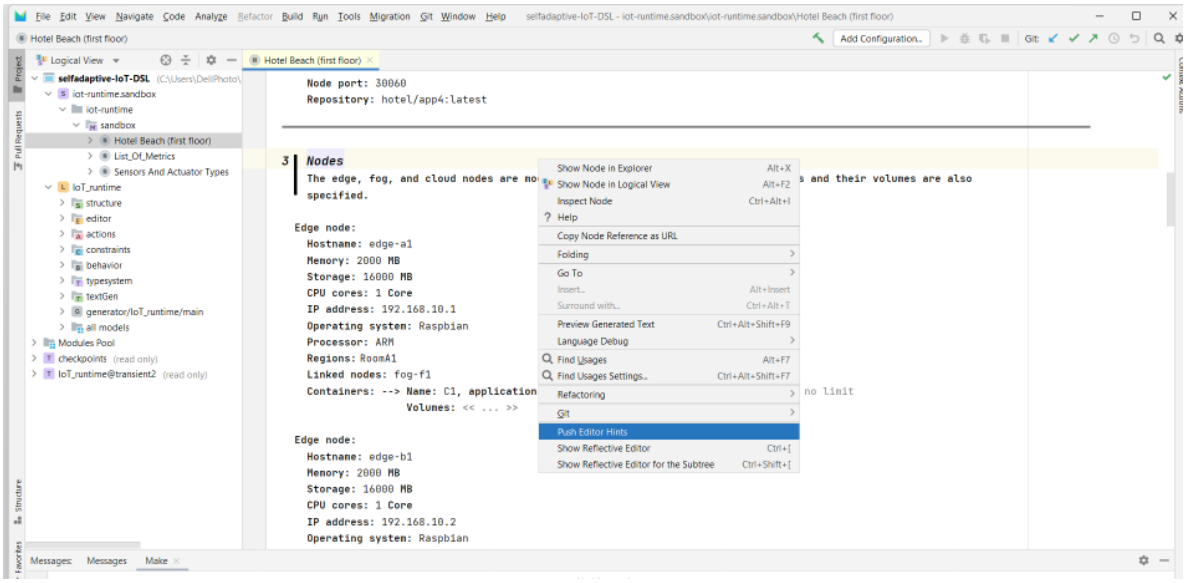
open this example model by double clicking and explore the concepts modeled for an IoT system.

The DSL has three notations (textual, tabular, and tree) to model the IoT system concepts. The notations for each concept are shown in Table 1.

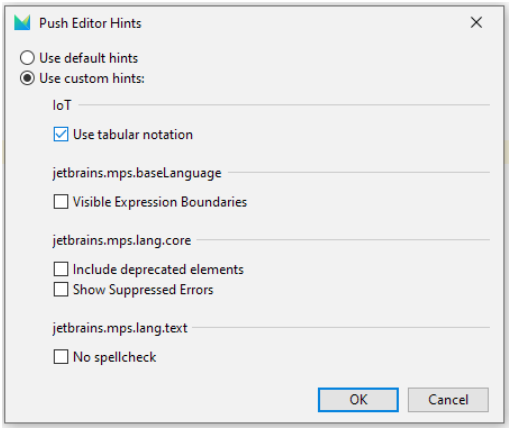
Textual	Tabular	Tree
• Applications • Nodes • Containers • IoT devices • Clusters • Adaptation rules	• Nodes • Containers • IoT Devices	• Regions

Table 1. DSL Notations

Three concepts (Nodes, Containers, and IoT Devices) can be modeled using two different notations (tabular and textual). The user is free to choose the notation. To change notation, right-click anywhere in the model workspace and select *Push Editor Hints*.



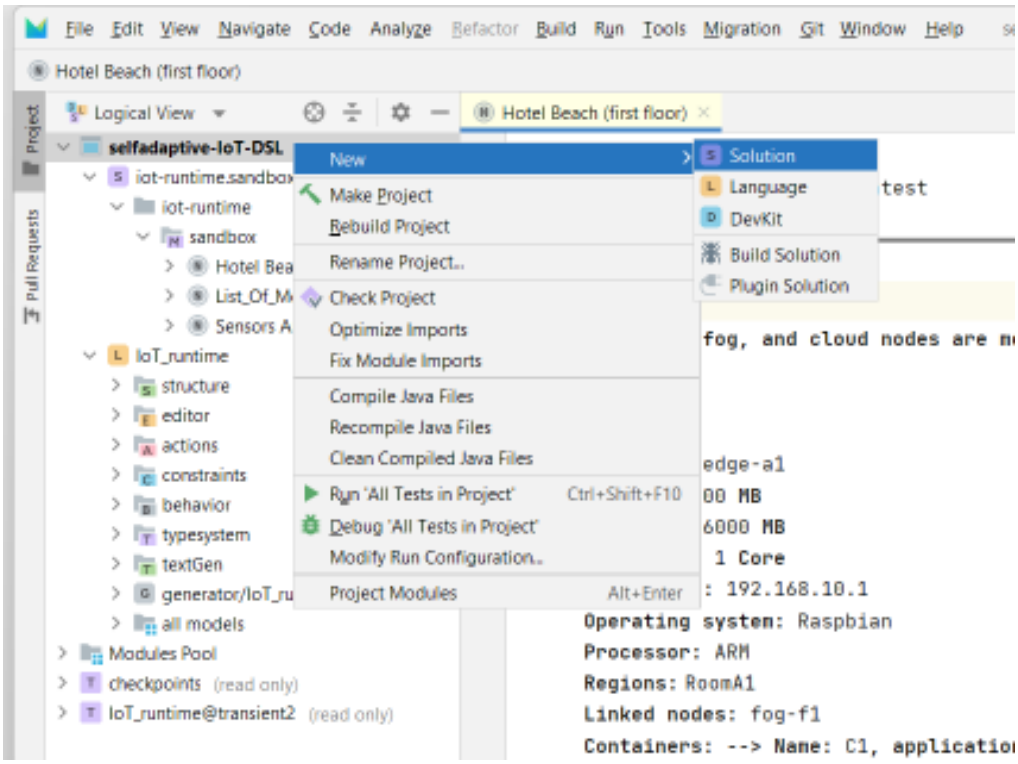
select *Use custom hints* and then check *Use tabular notation*.



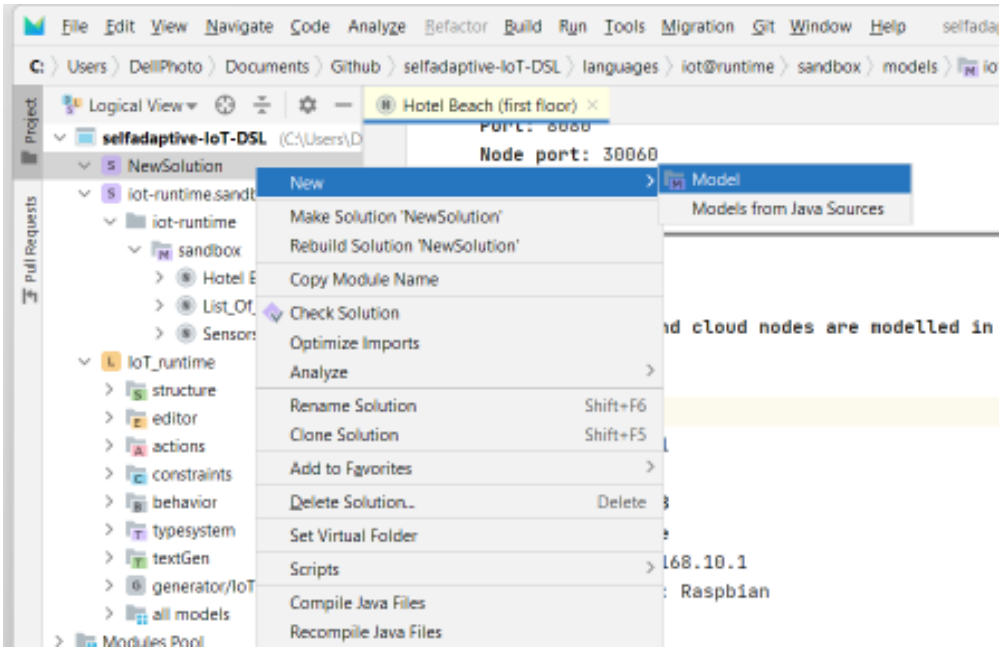
Now, you can see the model in tabular notation for the nodes, their software containers, and the IoT devices.

Create New Model

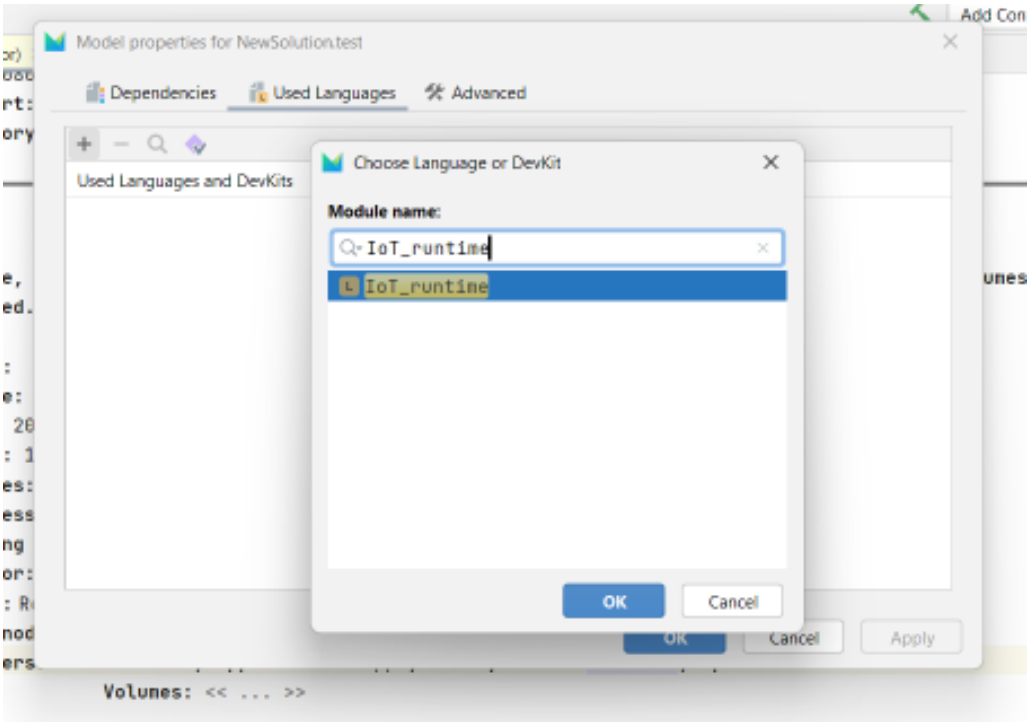
You can create new solution by right clicking on *selfadaptive-IoT-DSL -> New -> Solution*



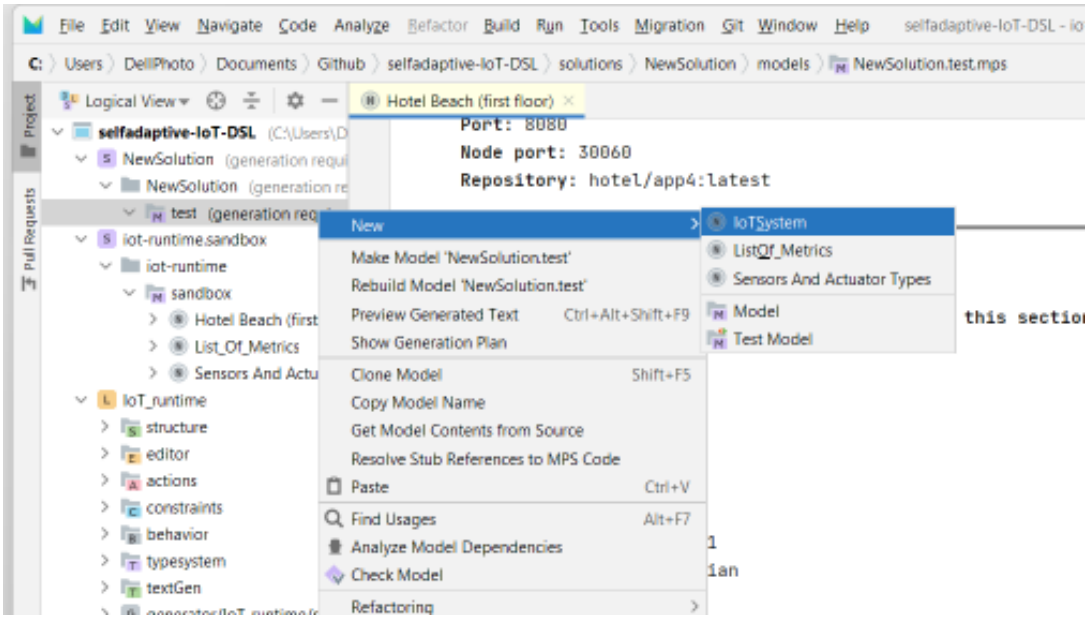
Then, create a new model by right clicking on your *solution -> New -> Model*



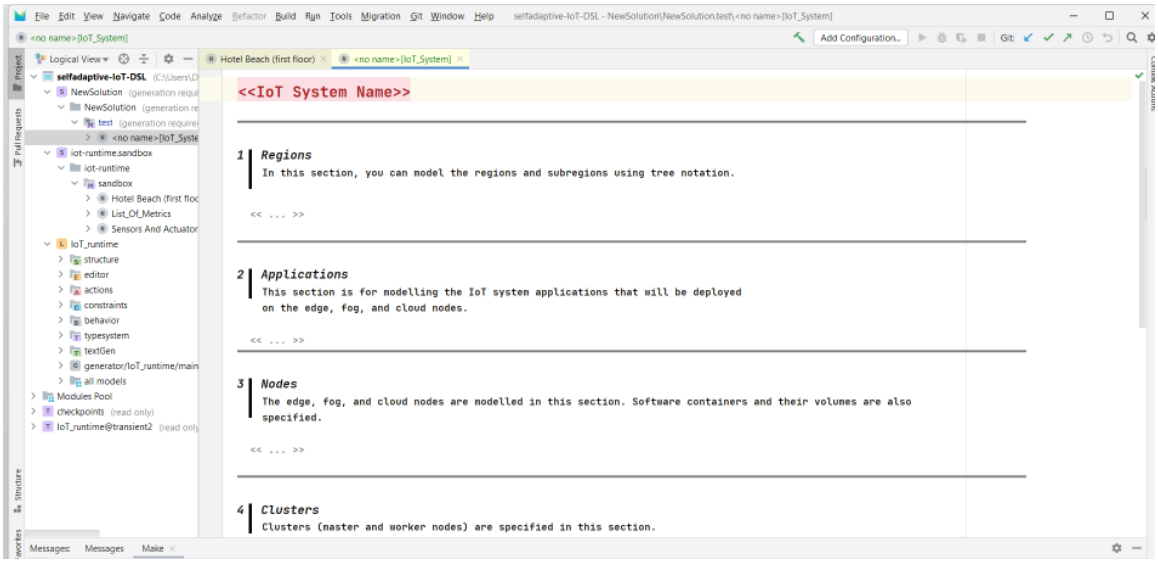
When you are creating a model, you have add ***IoT_runtime*** to *Used Languages.*



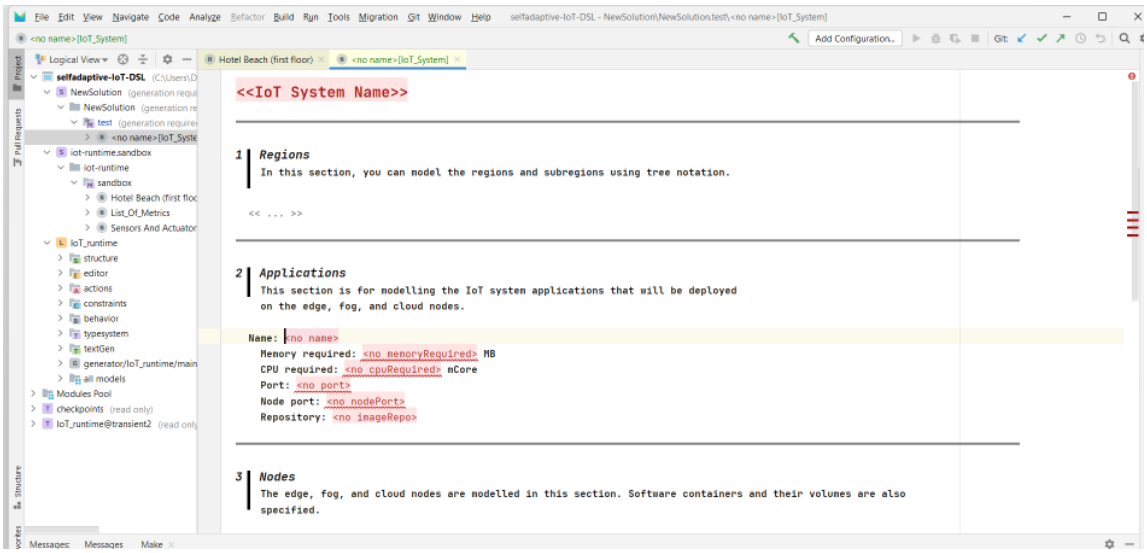
Finally, you can create a new IoT System model.



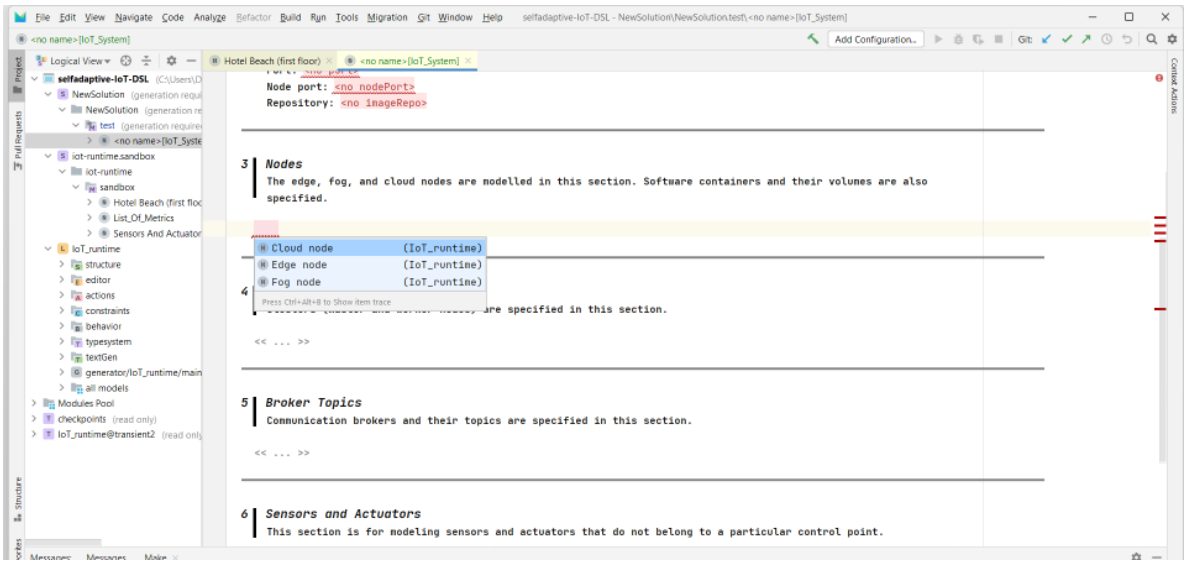
When you create a new model, you get a template for specifying the IoT system (see figure below).



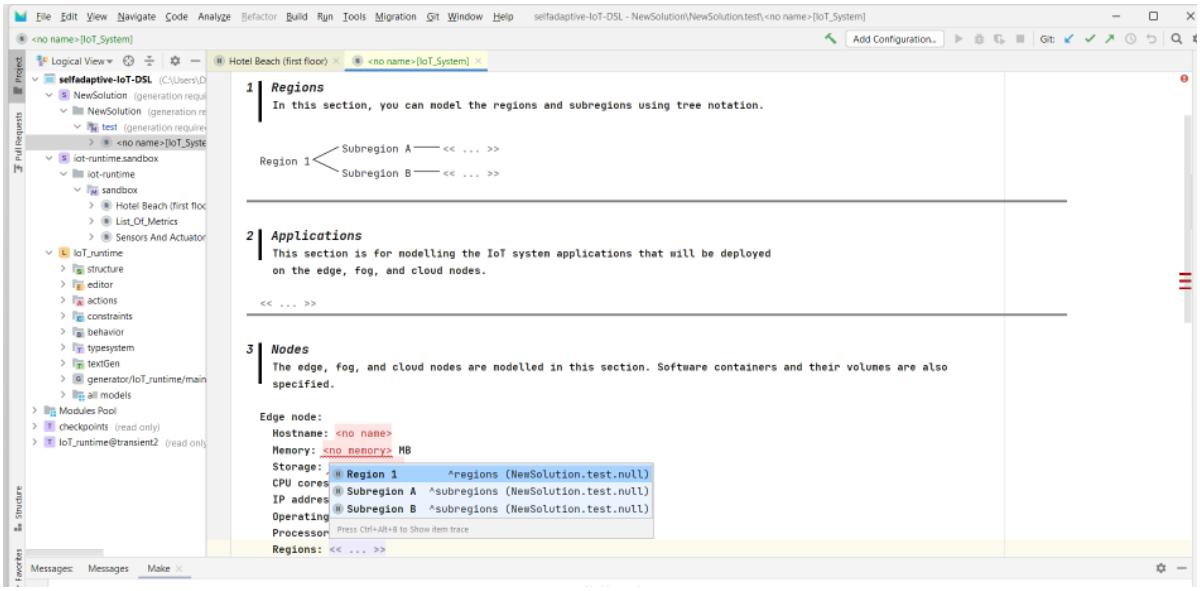
To model any aspect of the IoT system, just press the *Enter* key in the corresponding section and you will get a template with the attributes to be specified. For example, to model an application, press enter in the *Applications* section, you will get the model portion as shown below.



Some fields can be supported with the MPS autocomplete function. For example, when creating a new node, it is necessary to select the node type. To do this, press the Enter key in the Nodes section, and then the auto-complete function (by pressing Ctrl+space on windows or Cmd+space on MacOS). This will allow you to select one of the three types of nodes.



You can use the autocomplete function on any of the fields or attributes of a concept. In the example of the following image, we have defined two subregions. Then, when modeling the region of an Edge node, we can use the autocomplete function to quickly select one of the subregions we defined earlier.



Support material

DSL overview - *MOdeling LAnguages* blog entry

https://modeling-languages.com/modeling-self-adaptative-iot-architectures/

SAM'21 Presentation

https://www.slideshare.net/IvnAlfonso1/sam21-presentation

GitHub repository

https://github.com/SOM-Research/selfadaptive-IoT-DSL.git

MPS documentation

https://www.jetbrains.com/help/mps/mps-user-s-guide.html